

tific knowledge, could have been found to undertake the work. Already in 1867 Dr. Lunge had published a treatise in German on the subject; this has now been elaborated into the present excellent work, which describes the processes of manufacture as carried on in the largest and best arranged tar and ammonia works in England and the Continent. In the preparation of the newer work the author has received much assistance from Mr. Watson Smith, who has extensive knowledge of these processes as carried out in Lancashire.

Chapter I. is mainly concerned with the origin of coal-tar; with historical notes on its applications, and with the general characters of the tars obtained from various sources. Much in this chapter, as indeed in other parts of the work, is of direct interest to the gas-engineer. An iron smelter has been defined as one who makes slag, and the economical production of cast-iron is very much a question of the economical production of the proper sort of slag. So important indeed are, nowadays, the "residual" products in the manufacture of coal-gas that a gas-engineer may with even greater truth be described as a maker of coal-tar and ammonia-water, and we fully agree with Dr. Lunge that with the electric light looming in the near future, gas managers will have to consider the market prices of these "residuals," as influencing the mode of their manufacture, more carefully than they have hitherto done. They must in fact recognise that they are just as much makers of tar and ammonia as of coal-gas, and whether the one or the other is to be worked for must be governed by calculations depending upon the relative prices of gas and tar.

Chapter II. deals mainly with the properties of coal-tar and its constituents. A very complete list of these is given, and special attention is paid to their physical characters whenever these have been ascertained. Benzene, of course, is very fully described, even to an account of the rival theories of Kekulé, Claus, and Ladenburg as to its constitution. We entirely endorse Dr. Lunge's recognition of the enormous value of Kekulé's famous hypothesis in the development of the history of the aromatic derivatives; nevertheless the average tar distiller will, we are afraid, be lost in wonder and amazement at the idea of such fruitful consequences flowing from pictures of hexagons and prisms. In other words the description on p. 40 of the chemical constitution of the parent member of the aromatic group is far too bald to be of the slightest use to persons ignorant of the modern methods of representing constitution, and conveys no new information to those who know anything of such matters.

Chapter III. treats of the applications of coal-tar without distillation, such as its use for gas making, heating, and for the preservation of building materials and its use as an antiseptic, and in the manufacture of paints, varnishes, &c. Chapter IV. deals with the methods of distilling coal-tar, such as its distillation by steam and by fire. This and the next chapter (Chapter V.), on pitch, are extremely well illustrated by cuts and plates showing the best methods of constructing stills and condensing apparatus, mode of treating the gases and the different fractions, and a series of most valuable figures and tables are given of the results obtained in various works in England and on the Continent from different tars. Chapters VI. and VII. treat of anthracene and creosote

oil, and considerable attention is given to the important question of the quantitative determination of anthracene and of the so-called coal-tar acids. Chapter VIII. is concerned with phenol or carbolic acid and naphthalene, and contains many valuable details as to the manufacture of carbolic acid hitherto unpublished: we would especially instance the careful description of the manufacture of pure phenol, as carried on in Lancashire which is furnished by Mr. Watson Smith. Chapters IX. and X. treat of what is technically known as "light oil" or "crude naphtha," and of its rectification by steam. The last chapter (Chap. XI.) is entirely devoted to the subject of gas-liquor, or the ammoniacal liquor obtained at the gas works by condensation in the hydraulic main and by washing the gas in the scrubbers. Ammonia is in fact one of the most important products of the destructive distillation of coal; indeed the supply falls very far short of the demand made by the employment of ammoniacal salts in artificial manures and in the manufacture of soda ash by the modern method. The price of sulphate of ammonia has been practically doubled within the last twenty years. Whether ammonia will ever be produced commercially from the nitrogen of the air is a vexed question, but there is no doubt that if the coking of coals could only be carried out in a rational manner we might count upon an important addition to our stock of ammonia and of tar. It is indeed to this source that we must more immediately look for the increased supply so urgently needed.

Dr. Lunge has already enriched our literature by a most valuable treatise on another of our most important chemical industries, viz. the manufacture of alkali, and he has still further added to our debt by the publication of the present excellent manual. The work is extremely well got up, and deserves to be on the table of every gas manager and tar distiller in the kingdom.

T. E. THORPE

OUR BOOK SHELF

Tables for the Qualitative Analysis of "Simple Salts" and "Easy Mixtures." By Joseph Barnes. (Manchester: James Galt and Co.; London: Simpkin, Marshall, and Co., 1882.)

THESE tables are evidently compiled by one who has had considerable experience in teaching qualitative analysis; the directions are always clear and to the point; the student is not confused by too many alternative methods, neither is the art of analysis made altogether a matter to be learnt by rote. The short and simple solubilities table on p. 37 is especially to be commended. If we must have yet another set of tables for elementary qualitative analysis let us have these by Mr. Barnes; but have we not sufficient already?

LETTERS TO THE EDITOR

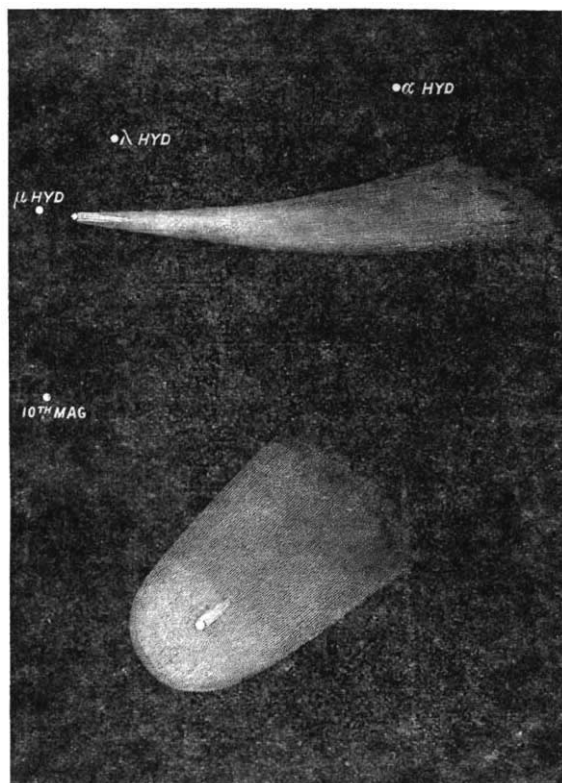
- [The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]
- [The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The Comet

AT 4.30 this morning this comet was a most conspicuous and lovely object in the clear sky, in the south-east. With the

assistance of Mr. Hodges and Mr. Percy Smith, the following details were obtained. The tail extended for quite $15''$ in length, and about $5''$ in width at its widest part, being slightly curved with the convexity downwards. The lower edge of the tail was very sharp, but the upper edge was gradually shaded off. The nucleus was considerably lengthened out in the direction of the tail to an extent of quite three times its width. Its estimated length was $10''$.

On examination with the spectroscope, with the nucleus across the slit, there appeared a narrow continuous spectrum crossed by three bands, which I at once recognised as the usual hydrocarbon lines; the central one was the brightest, and I could see no other lines but these three.



5 a.m. October 23, 1882.

At 5.2 a.m. Greenwich time, the position of the nucleus was determined with the equatorial to be R.A. 10h. 9m. 33s., Dec. $16^{\circ} 18'7''$, being a mean of two observations.

I send sketches of the comet, a small star, which I have not identified, appeared in the field of view about $2' 40''$ from the nucleus as drawn, and if identified may assist to check the position of the nucleus as given by the circles.

The morning was exceptionally clear, so much so, that, at dawn, when we could read small print out of doors, 4th magnitude stars were clearly visible.

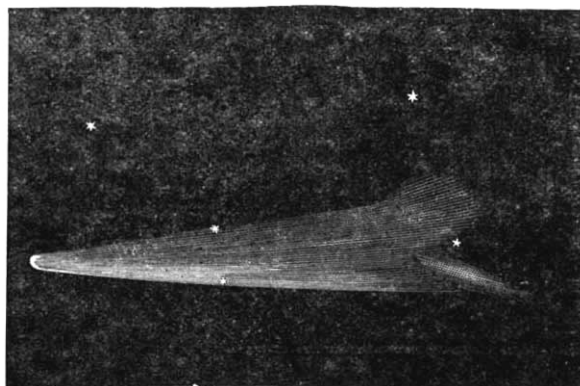
GEO. M. SEABROKE

Rugby, October 23

I INCLOSE a drawing made this morning after a prolonged examination (with a binocular) of the end of the comet's tail. Should you think the peculiar features which I have endeavoured to portray of sufficient interest to reproduce, the drawing is at your service. It is difficult to indicate truly features of this kind without exaggeration, if they are to catch the eye at all; but I am sure the exaggeration is very slight. The tail would seem to be about to end rather suddenly and with a broad end, when, from near the middle, shoots out, at a slight inclination to the general direction of the tail, a cleanly-shaded wisp. And as though this were due to a kind of cleft or parting, there is a corresponding broader sweeping-aside of the tail-end on the other side. One is at once reminded of the backward fraying of the broad side of a large feather. The effect is a decided enlarge-

ment of the end of the tail on one side, and a well-defined streamer shooting out at a slight inclination towards the other. The direction of the latter is such as to pass quite clear of the head, which is not a necessary consequence of its inclination, because of the curve which characterises the sharply-defined southern edge of the whole tail.

It is surely unusual for such decided features to present themselves at the very end of a comet's tail.



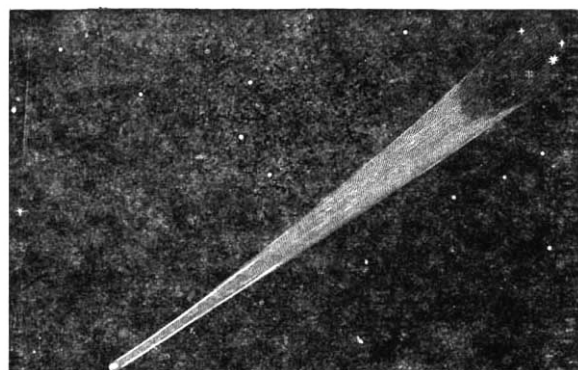
As a whole, the comet seems to have changed wonderfully little during the three weeks since I first saw it. Its change of place, also, is so moderate that, at this rate, there seems no reason why we should not see it for months yet. What if it should not vanish at all!

J. HERSCHEL

Collingwood, October 23

For several mornings past we have had fine views of the comet, first seen in England by Mr. A. Common. I inclose a sketch taken this morning, as accurate as I could make it with materials at hand.

It is chiefly remarkable (1) for the crescentic end of the tail, the lower or eastern horn being longer than the other; (2) for the distinctness of the shadow in the space beyond the tail, shadow obviously projected by the comet. Such a shadow I have never seen in any of the comets which have been under my observation during the last fifty years, nor do I recollect to have



The Comet from Cannes, October 21, between 5 and 6 a.m.

seen it described. (Here I have no access to books on the subject.)

I presume that the propinquity of this comet to the sun is the reason why the shadow is unusually visible in contrast to the luminosity around it; but probably the peculiar clearness of our atmosphere renders the phenomenon clearer than it may be in England. In any case the appearance is interesting in relation both to the nature of cometary matter, and to that of light and shade in space.

C. J. B. WILLIAMS

Villa du Rocher, Cannes, France, October 21